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(54) **ELECTRICAL LOAD CONTROL MONITORING UNITS (LCMUS)**

(57) A method of power switching includes receiving a command from an external aircraft controller to power an aircraft load from an aircraft voltage bus. The method includes in response to the command from the external aircraft controller (146), controlling a relay (110) to connect or disconnect an aircraft voltage bus from an aircraft load. Controlling the relay includes current monitoring the relay and voltage monitoring the relay power switching. The method can include receiving temperature feedback indicative of temperature of the relay, and using the temperature feedback for at least one of controlling the relay and/or prognostic and health monitoring. The method can include outputting feedback to the external aircraft controller relating to status, operation, and health of the relay.

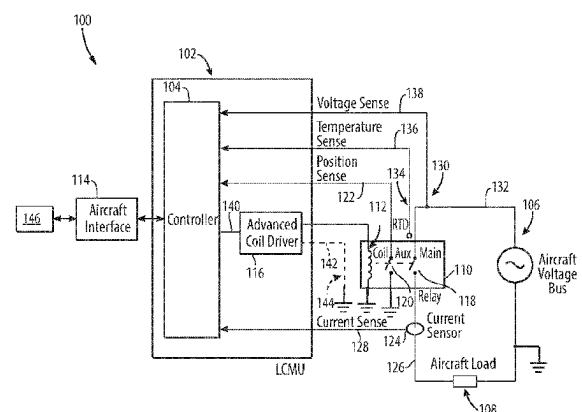


Fig. 1



EUROPEAN SEARCH REPORT

Application Number

EP 24 18 7523

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 9 711 309 B2 (EATON CORP [US]) 18 July 2017 (2017-07-18)	1-6,9	INV. H01H47/00
Y	* column 1, line 20 - column 11, line 43; figures 1-10 *	7,8,10	
Y	EP 3 588 114 A2 (HAMILTON SUNDSTRAND CORP [US]) 1 January 2020 (2020-01-01) * paragraph [0014] - paragraph [0032]; figures 1-5 *	10	
Y	US 2016/134208 A1 (BOCK CHRISTOPHER H [US] ET AL) 12 May 2016 (2016-05-12) * paragraph [0276] - paragraph [0280]; figure 41C *	7,8	
A	CN 102 427 231 A (UNIV SHANDONG) 25 April 2012 (2012-04-25) * paragraph [0035] - paragraph [0054]; figures 1-3 *	1-10	TECHNICAL FIELDS SEARCHED (IPC) H01H B64B B64D
A	CN 105 067 998 A (GUIZHOU TIANYI ELECTRICAL CO LTD) 18 November 2015 (2015-11-18) * paragraph [0013] - paragraph [0019]; figure 1 *	1-10	
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		14 November 2024	Drabko, Jacek
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

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☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-10

A system comprising:

a load control monitoring unit, LCMU, (102) wherein the LCMU includes a controller,

a relay (110) operatively connected to the LCMU for controlling connection and

disconnection of an aircraft voltage bus to and from an aircraft load, wherein the relay includes a

coil (112) operatively connected to be powered by the coil driver, an auxiliary switching device

(118) operatively coupled to be actuated by a magnetic field from the coil, and a main switching

device (120) operatively connected to be actuated by the magnetic field from the coil,

a current sensor (124) operatively connected to a load side of the main switching device

and to the controller; and

a voltage sensor (130) operatively connected to a voltage bus side of the main switching

device and to the controller

2. claims: 11-15

A method of power switching comprising:

receiving a command from an external aircraft controller to power an aircraft load from

an aircraft voltage bus; and

in response to the command from the external aircraft controller, controlling a relay to

connect or disconnect the aircraft voltage bus from the aircraft load, wherein controlling the

relay includes current monitoring the relay and voltage monitoring the relay.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82